

CLAIMS

1. A method of recombinantly producing a glucoamylase, said method comprising the step of expressing a polynucleotide encoding a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in a filamentous fungal host cell, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
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2. The method according to claim 1, wherein the polypeptide also comprises a starch-binding-domain (SBD).
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3. The method according to claim 2, wherein the starch-binding-domain comprises an amino acid sequence which is at least 80% identical to the sequence shown in positions 483 to 579 (both incl.) of SEQ ID NO: 2.
- 15 4. The method according to any of claims 1 - 3, wherein the polypeptide comprises an amino acid sequence which is at least 80% identical to the sequence shown in positions 19 to 579 (both incl.) of SEQ ID NO: 2.
- 20 5. The method according to any of claims 1 - 4, wherein the polypeptide comprises a linker between the starch-binding domain and the remaining polypeptide of at least 2 amino acids.
- 25 6. The method according to any of claims 1 - 5, wherein the polypeptide comprises a signal peptide.
7. The method according to claim 6, wherein the signal peptide comprises an amino acid sequence which is at least 95% identical to the sequence shown in positions 1 to 18 (both incl.) of SEQ ID NO: 2.
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8. The method according to any of claims 1 - 7, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical to the sequence shown in SEQ ID NO: 2.
9. The method according to any of claims 1 - 8, wherein the filamentous fungal host cell is of the genus *Aspergillus*.
- 35 10. The method according to claim 9, wherein the *Aspergillus* host cell is an *A. awamori*, *A. oryzae*, or *A. niger* cell.

11. The method according to any of claims 1 - 10, wherein a subsequent step of recovery and/or purification of the glucoamylase is performed.
12. A method for saccharifying liquefied starch, comprising the treatment of the liquefied starch
5 with a polypeptide having glucoamylase activity (E.C. 3.2.1.3), wherein the polypeptide comprises an amino acid sequence which is at least 70% identical to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2, whereby a % dextrose (DX) value of at least 96% is achieved at 30% w/w (g/100g dry matter) substrate concentration at 60°C, the DX value is determined as defined in Example 7 herein.
- 10 13. The method according to claim 12, wherein the polypeptide also comprises a starch-binding-domain (SBD).
14. The method according to claim 13, wherein the starch-binding-domain comprises an amino
15 acid sequence which is at least 80% identical to the sequence shown in positions 483 to 579 (both incl.) of SEQ ID NO: 2.
15. The method according to any of claims 12 - 14, wherein the polypeptide comprises an amino acid sequence which is at least 80% identical to the sequence shown in positions 19 to
20 579 (both incl.) of SEQ ID NO: 2.
16. The method according to any of claims 12 - 15, wherein the polypeptide comprises a linker between the starch-binding domain and the remaining polypeptide of at least 2 amino acids.
- 25 17. The method according to any of claims 12 - 16, wherein the polypeptide comprises a signal peptide.
18. The method according to claim 17, wherein the signal peptide comprises an amino acid sequence which is at least 95% identical to the sequence shown in positions 1 to 18 (both
30 incl.) of SEQ ID NO: 2.
19. The method according to any of claims 12 - 18, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical to the sequence shown in positions 1 to 579 (both incl.) of SEQ ID NO: 2.
- 35 20. A filamentous fungal host cell comprising at least one copy of a polynucleotide encoding a polypeptide having glucoamylase activity (E.C. 3.2.1.3), said polypeptide comprising an amino

acid sequence which is at least 70% identical to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.

21. The host cell of claim 20, wherein the polypeptide also comprises a starch-binding-domain
5 (SBD).

22. The host cell of claim 21, wherein the starch-binding-domain comprises an amino acid sequence which is at least 80% identical to the sequence shown in positions 483 to 579 (both incl.) of SEQ ID NO: 2.

10 23. The host cell according to any of claims 20 - 22, wherein the polypeptide comprises an amino acid sequence which is at least 80% identical to the sequence shown in positions 19 to 579 (both incl.) of SEQ ID NO: 2.

15 24. The host cell according to any of claims 20 - 23, wherein the polypeptide comprises a linker between the starch-binding domain and the remaining polypeptide of at least 2 amino acids.

20 25. The host cell according to any of claims 20 - 24, wherein the polypeptide comprises a signal peptide.

26. The host cell according to claim 25, wherein the signal peptide comprises an amino acid sequence which is at least 95% identical to the sequence shown in positions 1 to 18 (both incl.) of SEQ ID NO: 2.

25 27. The host cell according to any of claims 20 - 26, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical to the sequence shown in positions 1 to 579 (both incl.) of SEQ ID NO: 2.

30 28. The host cell according to any of claims 20 – 27 which is of the genus *Aspergillus*.

29. The host cell according to claim 28 which is an *A. awamori*, *A. oryzae*, or *A. niger* cell.

30. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in a starch conversion process, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
- 5 31. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in a continuous starch conversion process, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
- 10 32. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in a process for producing oligosaccharides, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
- 15 33. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in a process for producing specialty syrups, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
- 20 34. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in a process for producing ethanol for fuel or drinking ethanol (portable alcohol), wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
- 25 35. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in a process for producing a beverage, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
- 30 36. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in a fermentation process for producing organic compounds, such as citric acid, ascorbic acid, lysine, glutamic acid, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
- 35 37. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in detergents, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.
38. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in the pre-treatment of starch for extrusion, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.

39. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in compost and biological waste treatment, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.

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40. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in the purification of plant extracts for food additives, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.

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41. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in cosmetics and pharmaceuticals, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.

15 42. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in the baking industry, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.

20 43. Use of a polypeptide having glucoamylase activity (E.C. 3.2.1.3) in the production of pet food, wherein the polypeptide comprises an amino acid sequence which is at least 70% identical, to the sequence shown in positions 19 to 471 (both incl.) of SEQ ID NO: 2.